Prevalence and Socio-Demographic Factors of Anaemia among Under-Five Children in Rural Meerut

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Abstract: *Nutritional anaemia is recognized as a public health problem throughout the world. Infants and young children, who are the most vulnerable groups of the society, are especially affected.*
According to the global prevalence of anaemia 2011, it is estimated that in India 59% of under-five children have anaemia. The prevalence is seen more in rural areas than in urban areas. The consequences of anaemia are widely ranging and even mild anaemia due to micronutrient deficiencies affects growth, development and immunity. To keep in view the severity of this problem the present study was planned.
Objectives: *The present study was conductedto find out the prevalence of anaemia and socio-demographic factors associated with anaemia among under-five children (06-59 months) in a rural area of Meerut.*
Material And Methods: *A cross sectional study was conducted among 780 under five children (06- 59 months) using 30 clusters sampling technique in a rural area of Meerut.*
Results: *Outof 780 under-five children 537 (68.8%) children were found to be anaemic. Result showed a significant association (p<0.05) between prevalence of anaemia among under-five children and socio-economic status, typeof family and mother's education.*
Key words: *Anaemia, Meerut, Rural, Under-Five Children*

I. Introduction

Anaemia ranks as one of the most common maladies affecting mankind all over the world leading to severe reduction in productivity and heavilydraining curative health services. Infants and young children, who are most vulnerable groups of the society, are especially affected.[1]

Anaemia is characterized by a decrease in the number of red blood cells, sometimes with changed size or shape of the red blood cells, to a level that impairs the normal physiological capacity of the blood to transport oxygen to cells around the body. Anaemia is measured most reliably by a fall in haemoglobin concentration and can indicate poor nutrition and health.[2]

Nutritional anaemia is recognised as a public health problem throughout the world. According to the global prevalence of anaemia 2011 it is estimated that globally about 43% of under-five (06-59 months) children, 38% of pregnant women and 29% of non-pregnant women and 29% of all women of reproductive age have anaemia that corresponds to 273 million children, 496 million non-pregnant women and 32 million pregnant women. In India 59% of under five children, 54% of pregnant women, and 48% of non-pregnant women and 48% of all women of reproductive age have anaemia.[3]

As per the reports of NFHS-3, the prevalence of anaemia among under-five children (6-59 months) is 70 percent, in India. This prevalence is even more in rural areas, where it may be as high as 81 percent. The prevalence of anaemia in children rises steadily with the mother's level of anaemia, reaching 82% for children of mothers who are severely anaemic.[4]

In the preschool years, children undergo rapid growth, with an increase in red blood cells and high iron requirements. As children reach their third year, growth velocity decreases and daily iron requirements may decline. They are becoming ambulant and, if sanitation is poor, are more likely to acquire intestinal parasitic infections that cause iron deficiency. Young children are being weaned from breastfeeding but foods being given may be inadequate for their iron needs.[5]The consequences of anaemia are wide ranging and even mild anaemia due to micronutrient deficiencies affects growth development and immunity. The present study was conducted to find out the prevalence of anaemia and socio-demographic factors associated with anaemia among under-five children (06-59 months) in a rural area of Meerut.

II. Materials And Methods

The present cross-sectional study was conducted among under-five children (06-59 months)in the rural population of district Meerut around Machhara block Community Health Centre, which is the field practice area of the Department of Community Medicine of L.L.R.M. Medical College Meerut. The study subjects were selected by using 30 clusters sampling technique from villages covered by Machhara block, Dist. Meerut. The sample size of 384 was calculated by using the formula $n = Z^2pq/d^2$, assuming the prevalence of anaemia as 80% with relative precision of 5% at 95% confidence interval.

Because of 'DESIGN EFFECT', to obtain same precision in cluster sampling, twice as many as individual would have to be studied with the 30 cluster sampling technique. Thus for covering 768 (384x2) children in 30 clusters, 780 subject were studied from the population covering minimum 26 children per cluster.

All the information was collected from mother/informant on a pre-designed & pretested questionnaire and haemoglobin estimation was done by haemoglobin colour scale (chromatography paper) method in children aged six months to five years.

Anaemia was classified based on the World Health Organization recommended cut off values for Hb and was graded as mild, moderate and severe (TABLE-1).6

Table 1: Haemoglobin level to diagnose anaemia and severity among under-five children

Hb concentration (g/dl)	GRADE
Hb≥ 11.0 g/dl	Normal (No anaemia)
Hb10.0 to <11.0 g/dl	Mild Anaemia
Hb7.0 to <10.0 g/dl	Moderate Anaemia
Hb< 7.0 g/dl	Severe Anaemia

III. Results

Out of 780 children, 537 (68.8%) children were found to be anaemic. The prevalence of anaemia among male and female children was found to be 69.8% and 67.8% respectively.

Table 2: Prevalence of anaemia among under-five children in relation to age and sex

Age Groups (months)	Study population			Children with anaemia		
	Total	Male	Female	Total	Male	Female
				No. (%)	No. (%)	No. (%)
6–12	56	30	26	44(78.6)	23 (76.7)	21 (80.7)
12–24	219	111	108	164 (74.9)	85 (76.6)	79 (73.1)
24–36	221	117	104	147(66.5)	76 (65.0)	71 (68.3)
36–59	284	159	125	182 (64.1)	107(67.2)	75 (60.0)
Total	**780**	**417**	**363**	**537 (68.8)**	**291 (69.8)**	**246 (67.8)**
$\chi^2_{(sex)} = 0.368$ df =1 p >0.50						
$\chi^2_{(age)} = 24.7$ df =3 p <0.001						

TABLE-2 shows that the prevalence of anaemia decreased with increase in age among under five children in both the sex. The maximum prevalence was found in children age group 6-12 months of age 78.6% while the   minimum prevalence was found in children of age group 36-59 months 64.1%. However this difference in prevalence of anaemia in relation to age was found to be statistically significant (p < 0.001)but the difference inprevalence of anaemia in relation to sex was not found to be statistically significant (p>0.50).

Table 3: Severity of anaemia among under-five children with relation to sex

Sex	Total (%)	Anaemia			No anaemia
		Mild Number(%)	Moderate Number (%)	Severe Number (%)	Number (%)
Male	417 (53.5)	147 (35.3)	133 (31.9)	11 (2.6)	126 (30.2)
Female	363 (46.5)	131 (36.1)	106 (29.2)	9 (2.5)	117 (32.2)
Total	**780 (100.0)**	**278 (35.6)**	**239 (30.6)**	**20 (2.6)**	**243 (31.2)**
$\chi^2_{(severity)} = 0.403$ df = 2 p >0.05					

TABLE-3 shows the sex wise distribution of Hb% among under-five children. The proportion of severe, moderate and mild anaemia among male children 2.6%, 31.9% and 35.3% respectively in comparison to 2.5%, 29.2% and 36.1% respectively among female children. The difference in prevalence of anaemia in relation to sex and severity was not found to be statistically significant (p > 0.05).

Table 4: Sociodemographic factors affecting anaemia

Serial no	Socio-demographic factors	Total	Anaemia		χ^2
			Present	Percentage	
1.	**Socio economic class**				χ^2=54.6
	Upper	52	32	61.5	df=4
	Upper Middle	139	75	53.6	p <0.001
	Lower Middle	237	141	59.5	
	Upper lower	266	216	81.2	
	Lower	86	73	84.9	
2.	**Type of Family**				χ^2 = 21
	Nuclear	208	117	56.3	df=1
	Joint	572	420	73.4	p <0.05
3.	**Mother's education**				χ^2=67.6
	Illiterate	36	29	80.6	df=6
	Just literate	75	48	64.0	p <0.001
	Primary	107	65	59.8	
	Middle	228	179	78.5	
	High school	183	142	77.6	
	Intermediate	102	61	59.8	
	Graduate and above*	43	12	30.2	
	Professionals *	6	11	16.7	
*clubbed together for χ^2 calculation.					

TABLE-4 shows that a majority of children 266 (34.1%) belonged to upper lower class and only 52 (6.7%) belonged to upper class. The prevalence of anemia was maximum in lower class (84.9%) and gradually decreased with the rise in socio-economic status, being minimum in upper middle class (53.6%), and this difference in prevalence of anemia was found to be statistically significant (p<0.001).

The prevalence of anemia was found to be 73.4% and 61.5% among the children belonging to joint and nuclear families respectively and this difference in prevalence of anemia in relation to type of family was found to be statistically significant (p <0.05).

A statistically significant difference was seen in the prevalence of anemia amongunder-five children in relation to mother's education (p <0.001) with the prevalence being minimum (16.7%) in the children whose mothers were educated up to professional level and maximum (80.6%) in children of illiterate mother.

IV. Discussion

In the present study, overall prevalence of anemia was found to be 68.8% amongst under five children, which is comparable to 70%, 70.8% and 69.5% as reported by National Family Health Survey (NFHS-3)[4], Singh et al[7]and Goswami et al[8]but is higher than 59% and 52.5% as reported by Arlappa et al (2014)[9] and Dey et al[10] in rural under five children respectively. The present study showed no statistically significant difference (p>0.05) regarding the prevalence of anemia among male and female children which is consistent with the finding of NFHS-3[3] and Khan et al (2016).[11]

In present study children of 6–12 months age group had highest prevalence of anemia (78.6%). The prevalence of anaemia reduced with increasing age being lowest (64.1%) in 36-59 months age group (p < 0.05), it can be possibly attributed to poor iron stores at birth due to poor maternal iron stores, delay in initiation of complementary feeding and deficient diet. These findings are similar to 77% prevalence of anaemia in 06-12 months age, as reported by NFHS–3[4] and 76.5% as reported byArlappa et al (2014).[9]This finding further demands adequate iron supplementation during pregnancy and more emphasis on adequate complementary feeding.

In the present study 2.6% children had severe anaemia, which is comparable to 1.9%, 2.7%and 3% as reported by Kapur et al[12,]Joshi et al (1983)[13] and Arlappa et al (2014)[9] respectively.

In present cross-sectional study the prevalence of anaemia was found higher (84.9%) among children belonging to lower socioeconomic class and lowest (53.6%) in children of upper middle socio economic class. The relation between the prevalence of anaemia and socioeconomic status was found to be statistically significant (p<0.001). Ewusie et al (2014)[14] reported that the prevalence of anaemia in children from low income households was significantly higher, (85.6%) than children from high income households, (66.3%). This association with socioeconomic status clearly indicates association of anaemia with deficient diet and poor hygienic conditions which are attributes of poor economic status.

The prevalence of anaemia in present study was 73.4% and 56.3% in children belonging to joint families and nuclear families respectively and this association found to be statistically significant (p<0.05). This difference in prevalence of anemia according to type of family may be due to better care

and nutrition to the children given by mother in nuclear families as compare to mothers of the children in joint families.

Education of mother plays an important role to hinder the development of anaemia. In the present study an inverse association was observed between prevalence of anaemia and education of parents as the prevalence of anaemia among children of professional mothers was 33% as compared to 88.8% in children of illiterate mother.This was found to be statistically significant.According to NFHS-3 (2005-06) the prevalence of anaemia among children improve as the education level of mother increases.[4] Therefore education ofparents seems to play an important role in reducing prevalence of anaemia among children.

V. Conclusion

The present study demonstrates that the prevalence of anaemia among under five years children remain high (68.8%) and especially affect the children below 36 months of age. The prevalence of anaemia is high (88.8%) among children of illiterate mother and low economic status.

VI. Recommendation

As recommended by World Health Organization[15], the preferred anaemia prevention strategy for this group is iron and folic acid supplementation. The promotion of exclusive breast feeding up to the age of six months, timely initiation of balanced and adequate complimentary feeding, diversification of food-complementation diet, improvement of living conditions, nutritional education to mother and health education programmes can be other strategies to improve the health of children below 5 years.

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